Microsoft Corporation
One Microsoft Way
Redmond, WA 98052-6399

Tel 425 882 8080
Fax 425 936 7329
http://www.microsoft.com/

Microsoft

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Mr. Edward Thomas
Chief, Office of Engineering and Technology
Federal Communications Commission
445 12th Street, SW
Washington, DC 20054

Subject: ET Docket No. 02-135

Dear Mr. Thomas:

Though it can sometimes seem otherwise, not all the news coming from the communications industry is bad news. In the wireless sector, there are new technologies, new applications, new investment and excitement about the future.

In what are sometimes called the "unlicensed bands," [1] an astonishing array of advanced communications equipment has been developed, sold and used -- providing businesses and consumers across the country with new types of broadband connections. Not coincidentally, these new devices are beginning to have an impact on economic efficiency and economic growth.[2] Microsoft believes that, as the Commission reviews its general approach to spectrum regulation, there is much to be learned from the extraordinary success of these unlicensed bands. It also believes that, as successful as the Commission's regulation of these bands has been, even greater success is possible.

As the Commission's rules already recognize, the users and uses of the spectrum are so diverse that a variety of approaches to spectrum licensing is required. Microsoft believes that an even greater diversity in licensing regimes than we have today would

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1 As a legal matter, the use of these bands is licensed by rule rather than by individual license -- the use of the bands is not really "unlicensed."

2 Between 2001 and 2006, the number of WLAN public hot spots is estimated to grow from 2000 to 42,000 and service revenue is expected to grow from $11.3 million to $642.6 million. Worldwide enterprise WLAN system sales are expected to grow to $3 billion by the end of this year, from $1.8 billion in 2001. Within four years, the number of users linked to a hot spot is expected to reach 21 million.

lead to more innovation, better spectrum utilization, and to economic and consumer benefits. In particular, we believe that more rigorous limits might be placed on certain unlicensed technologies in order to foster unlicensed broadband networking.

There are two key dimensions to the Commission's approach to spectrum regulation: centralization of control and specification of use. Individually licensed spectrum is centrally controlled by a single licensee (under FCC supervision), and is typically allocated for a specific use (often with associated technical and commercial restrictions). On the other hand, control in unlicensed bands is decentralized; no single entity owns the band and its uses are generally unspecified (with few technical and commercial restrictions).

Over the past few years, the Commission has often granted individual licensees greater flexibility in how they use their licenses.[3] This trend towards relaxing the use specifications on individually licensed bands is an important and worthwhile innovation in spectrum management. In the same spirit of innovation, as noted below, Microsoft believes that the FCC should also experiment with more deliberate regulation of some unlicensed bands.

The Appeal of Unlicensed Broadband Networking

We understand there are diverse public policy goals the Commission must consider as it evaluates various approaches to spectrum regulation. Microsoft believes that one exemplary goal would be to accelerate the development of wireless broadband networks. In Microsoft's view, unlicensed bands -- if upgraded modestly and in a targeted way -- are uniquely well suited for the creation of such a broadband infrastructure.

The unlicensed bands are ideal for the creation of wireless broadband networks for a variety of reasons. One is that they can be easily accessed by all, from the largest corporations to the smallest entrepreneurs. Indeed, the history of the 2.4 GHz unlicensed band reflects a significant level of innovation from small entrepreneurs

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[3] See, e.g., Amendment of Part 2 of the Commission's Rules to Allocate Spectrum Below 3 GHz for Mobile and Fixed Services to Support the Introduction of New Advanced Wireless Services, including Third Generation Wireless Systems; Amendment of the U.S. Table of Frequency Allocations to Designate the 2500-2520/2670-2690 MHz Frequency Bands for the Mobile-Satellite Service, First Report & Order and Memorandum Opinion & Order, 16 FCC Rcd. 17222 (2001) (adding a mobile allocation to the band used by MDS and ITFS licensees); Amendment of Parts 21 and 74 to Enable Multipoint Distribution Service and Instructional Television Fixed Service Licensees to Engage in Fixed Two-Way Transmission, Report & Order, 13 FCC Rcd. 19112 (1998) (allowing MDS and ITFS licensees to provide two-way services).

who were attracted to the band by its easy availability and lack of individual licensing requirements.[4] Another is that with the bands open to anyone who buys a compliant device and plugs it in, a significant part of the capital invested in creating the networks comes from individuals and businesses – it need not come primarily from network operators.

Indeed, one of the most important and often overlooked consequences of the creation of unlicensed bands was the tapping of an entirely new source of capital to build networks: the financial resources of the users themselves. While this source of capital would be important at any time, it is critical now, when the capital markets are so difficult to navigate for even the most successful carriers. Today's constraints on traditional investment capital create even greater risk that the build out of broadband networks will be slower than anticipated. One forecast by market researchers RHK Inc. of San Francisco estimated total equipment spending (not just broadband) by carriers in 2001 at $370 billion. The actual figure was $220 billion. Thomas Weisel Partners, an investment firm, has projected that purchasing will fall an additional 23% this year – and that forecast predates the recent WorldCom revelations.[5]

The fact is that capital markets are only open for new telecommunications investments if carriers are willing to pay a historically high cost for capital – even though risk-free interest rates are at historical lows. On the other hand, the Federal Reserve's M2 figure, perhaps the best measure of the cash or cash equivalents available to the American people, is over 5 trillion dollars, some of which they might well wish to spend on unlicensed broadband connections.

Unlicensed spectrum is also ideal because it is open to, and can support, a multiplicity of technical solutions. Moreover, thanks to advances in wireless and computing technology, the unlicensed wireless networks available to the American people may well be dramatically different than existing networks.

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4 Even economically efficient individual licensing regimes, such as auctions, impose substantial burdens that can deter small entrepreneurs and innovation. The availability of secondary markets and the like, while helpful, does not eliminate all of the burdens.

5 The job market has also been adversely affected by these developments. Last month, the telecom industry disclosed the layoffs of 30,455 employees. The telecom industry has had the largest number of reductions of any industry in the last nine out of 12 months. So far in 2002, the sector has eliminated 165,840 jobs, 23% of the national total for all sectors." http://www.informationweek.com/story/IWK20020702S0003

What the Commission Can Do

As noted above, no single approach to spectrum regulation is perfect. And that is true even for unlicensed spectrum. While the current rules for unlicensed spectrum have been enormously successful, they have also permitted less than optimal use of the available frequencies. Inevitably, where there are virtually no rules of the road and anything is possible, some entrepreneur will design a technology that interferes with other technologies – sometimes because it must, sometimes simply because it is cheaper. Simply put, there is an identifiable cost associated with the current approach to unlicensed spectrum. This cost may make the development of competitive unlicensed broadband networks much more difficult than it needs to be, if not impossible.

Microsoft therefore believes that the nation would best be served by more than one "flavor" of unlicensed spectrum regulation. In addition to the current approach typified by the 2.4 GHz band, the Commission might consider the creation of "unlicensed broadband spectrum" for the evolution of technologies and business modes, such as wireless data networks, that could supplement cable and DSL services. Such unlicensed broadband spectrum could jump start the creation of competitive wireless broadband networks across the U.S.

The Commission should also intensify its efforts to determine whether new unlicensed devices and technologies can provide "underlay" services in licensed bands without causing harmful interference. Wideband technologies, for example, offer the promise of providing substantial amounts of spectrum capacity without causing harm to incumbent licensees. Such technologies are another way that user-funded unlicensed solutions could provide both middle mile (from a backbone access point to a neighborhood) and last mile (from a neighborhood access point to the home) broadband connectivity.

As a starting point, Microsoft believes the Commission should take a few modest steps to encourage unlicensed broadband data uses:

- It should allocate additional spectrum below 2 GHz and additional spectrum in the 5 GHz band for unlicensed broadband uses.

- The regulatory regime for unlicensed broadband spectrum (including existing unlicensed spectrum at 5 GHz) should: (1) require that devices be capable of two-way packet data communication; (2) require the observance of media access rules that minimize interference and maximize spectrum efficiency (including perhaps receiver standards); and (3) provide users of unlicensed devices a degree of protection from interference from individually licensed services.

- Finally, the Commission should do its own testing, including in real-world deployment, to determine whether unlicensed "underlay" technologies (such as wideband) can co-exist with individually licensed services. If necessary, the Commission should increase its capacity to do such testing.

It is important to the communications sector, to the economy, and to the nation that wireless broadband networks be built that have at least the same capacity as cable and wire networks. Such networks can develop in unlicensed spectrum -- using technologies, network architectures, and financing models that are different than those used by the existing networks. The FCC can, by adopting commonsense modifications to the existing regulatory regime for unlicensed spectrum create the perfect environment for the creation of such networks.

Respectfully Submitted,

Craig J. Mundie
Senior Vice President,
Chief Technical Officer,
Advanced Strategies and Policy